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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/045,376	11/09/2001	Brian S. Doyle	42390.P5768D	5627

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EXAMINER

LE, DUNG ANH

ART UNIT	PAPER NUMBER
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2818

DATE MAILED: 06/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/045,376	Applicant(s) DOYLE ET AL.	
	Examiner DUNG A LE	Art Unit 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2002.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 5 and 16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 8-15, 17 and 18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

DETAILED ACTION

*The previous Office Actions have been withdrawn. This is a new ground of rejection.*

**Claim Rejections**

**Set of claims 1-7**

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1, 5- 7 are rejected under 35 USC 102 (b) as being anticipated by Fuse (5223445).**

Fuse teaches a transistor device, comprising: a substrate having a source region 6, a drain region 6 and a channel region, in which at least one of the source, drain and channel regions has a void to place one of the regions into a compressive or tensile stress to alter carrier mobility due to the stress; and a gate region 2 formed over the channel region (col 1, lines 25- 40, line 63 to line 13 next column fig. 14a).

**Regarding claim 5.** (Canceled)

**Regarding claim 6,** Fuse teaches the void 10 is located in the channel region and near an edge of the channel region adjacent to the source region [fig. 14b]..

**Regarding claim 7,** Fuse also teaches the void 10 is located in the channel region near an edge of the channel region adjacent to the drain region [fig. 14b].

### **Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 2-4 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Fuse 95223445) in view of Kokubun (6248652).**

Fuse discloses the claimed invention as applied to claim 1, except for the void is located substantially in a center of the channel region..

Kokubun disclose the void 4 is located substantially in a center of the channel region.[figs.7a- 7c] .

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the void which is located substantially in a center of the

channel region, as taught by Kokubun in order to obtain suitable device for desired application.

**Regarding claims 3 and 4,** Fuse discloses the claimed invention as applied to claim 1, except for the void is approximately 50 nm across, the void is located at a depth of approximately 1000 angstroms in the channel region as cited in the present claims

However, it would have been obvious to one having ordinary skill in the art making semiconductor device to determine the workable or optimal value for the void having the aforementioned limitations through routine experimentation and optimization to optimal device performance.

**Set of claim 8-14.**

**Claims 8- 12 are rejected under 35 USC 102 (b) as being anticipated by Fuse (5223445).**

Fuse teaches a transistor, comprising: a substrate having a source region, a drain region and a channel region, in which a void 10 is located below the source region 6 to place one of the regions into a compressive or tensile stress to alter carrier mobility due to the stress; and a gate region above the channel region [col 1, lines 25- 40, line 63 to line 13 next column, fig. 14b].

**Regarding claims 9 - 12** , a void 10 is also located below the drain region 6 and the source and drain regions 6 are under compressive stress, the source region is under tensile stress and the drain region is under compressive stress [Fuse, col 1, lines 25-38].

**Regarding claim 13**, the gate region is polysilicon [Fuse, col 3, line 63].

**Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fuse as applied to claim 8 above, and further in view of Adan (6288425).**

Fuse discloses gate region is conductive material (e.g. polysilicon in column 4, line 38), but fails to disclose gate region is metal.

However, Adan show the gate region is make of polysilicon, metal as set forth in column 4, lines 18-22. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the gate region of metal as taught by Adan in Fuse's device because the material such as polysilicon and metal are recognized equivalent materials for forming the gate region of transistor and they are interchangeable.

**Set of claims 15-18**

**Claims 13-16 are rejected under 35 USC 102 (b) as being anticipated by Fuse (5223445).**

Fuse teaches a transistor comprising: a substrate having a source region 6, a drain region 6 and a channel region; and a gate region having a void 10 to place the substrate under mechanical stress to alter carrier mobility due to the stress [col 1, lines 25- 40, line 63 to line 13 next column, fig. 14b].

**Regarding claim 16.** (Canceled)

**Regarding claim 17,** Fuse teaches the gate region is polysilicon [col 3, line 63].

**Regarding claim 18,** the gate region is metal (see rejection of claim 14).

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung A. Le whose telephone number is 703-306-5797. The examiner can normally be reached on Monday-Friday 8:00am-5: 30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 703-308-4910. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Dung A. Le  
Examiner

A handwritten signature in black ink, appearing to be 'DL' or similar, written over the printed name 'Dung A. Le'.